

Assemblers and Fabricators

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Significant Points

- A decline in employment is expected, reflecting increasing automation and the shift of assembly to countries with lower labor costs.
- Work areas may be noisy, and many assemblers may have to sit or stand for long periods.
- A high school diploma is preferred for most positions; specialized training is required for some assembly jobs.

Nature of the Work

Assemblers and fabricators produce a wide range of finished goods from manufactured parts or subassemblies. They produce intricate manufactured products, such as aircraft, automobile engines, computers, and electrical and electronic components.

Assemblers may work on subassemblies or the final assembly of an array of finished products or components. For example, *electrical and electronic equipment assemblers* put together or modify missile control systems, radio or test equipment, computers, machine-tool numerical controls, radar, or sonar, and prototypes of these and other products. *Electromechanical equipment assemblers* prepare and test equipment or devices such as appliances, dynamometers, or ejection-seat mechanisms. *Coil winders, tapers, and finishers* wind wire coil used in resistors, transformers, generators, and electric motors. *Engine and other machine assemblers* construct, assemble, or rebuild engines and turbines, and of-fice, agricultural, construction, oilfield, rolling mill, textile, woodworking, paper, and food-wrapping machinery. *Aircraft structure, surfaces, rigging, and systems assemblers* put together and install parts of airplanes, space vehicles, or missiles, such as landing gear. *Structural metal fabricators and fitters* cut, align, and fit structural metal parts according to detailed specifications prior to welding or riveting.

Assemblers and fabricators involved in product development read and interpret engineering specifications from text, drawings, and computer-aided drafting systems. They also may use a variety of tools and precision measuring instruments. Some experienced assemblers work with engineers and technicians, assembling prototypes or test products.

As technology changes, so too does the manufacturing process. For example, automated manufacturing systems include applications of robotics, computers, programmable motion control, and various sensing technologies. These systems change the way in which goods are made and affect the jobs of those who make them.

The concept of “lean” manufacturing, for example, places a greater premium on teamwork and communication within “cells” of workers than it does on the assembly line process. *Team assemblers* perform all of the assembly tasks assigned to their teams, rotating through the different tasks, rather than specializing in a single task. They also may decide how the work is to be assigned and how different tasks are to be performed. This worker flexibility helps companies to cover for absent workers, and increases their ability to respond to changes in demand by shifting labor from one product line to another. For example, if demand for a product drops, companies may reduce the number of workers involved, while individual

workers perform more stages of the assembly process. Some aspects of lean production, such as rotating tasks, are becoming more common to all assembly and fabrication occupations.

Working Conditions

The working conditions for assemblers and fabricators vary from plant to plant and from industry to industry. Work areas may be noisy, and many assemblers may have to sit or stand for long periods. Both electronic and electromechanical equipment assemblers, for example, sit at tables to perform much of their work, although their surroundings are generally clean, well-lit, and free from dust. Some electrical and electronics assemblers come in contact with soldering fumes, but ventilation systems and fans normally minimize this problem. Assemblers of equipment that is vulnerable to dust and dirt, such as transmissions, may work in clean rooms that are designed to minimize contamination. Aircraft assemblers, however, usually come in contact with oil and grease, and their working areas may be quite noisy. They also may have to lift and fit heavy objects. In many cases, improvements in workstation design and the increased use of overhead cranes and other power-lifting equipment have improved working conditions.

Most full-time assemblers work a 40-hour week, although overtime and shiftwork is fairly common in some industries. Work schedules of assemblers may vary at plants with more than one shift.

Employment

Most of the 2.1 million assembler and fabricator jobs in 2002 were in manufacturing; most of the 7 percent who were employed by employment services firms also worked in manufacturing plants. Team assemblers, the largest specialty, accounted for 55 percent of assembler and fabricator jobs. The distribution of employment among the various types of assemblers was as follows:

Team assemblers	1,174,000
Electrical and electronic equipment assemblers	281,000
Structural metal fabricators and fitters	89,000
Electromechanical equipment assemblers	60,000
Engine and other machine assemblers	50,000
Fiberglass laminators and fabricators	37,000
Coil winders, tapers, and finishers	36,000
Aircraft structure, surfaces, rigging, and systems assemblers ...	27,000
Timing device assemblers, adjusters, and calibrators	6,500
All other assemblers and fabricators	361,000



Most assemblers and fabricators work in manufacturing.

Manufacturing industries employ 80 percent of assemblers and fabricators. Assembly of computers and electronic products accounted for 13 percent of all jobs. Assembly of transportation equipment, such as aircraft, autos, trucks, and buses accounted for 19 percent of all jobs. Other industries that employ many assemblers and fabricators were machinery manufacturing (heating and air-conditioning equipment; agriculture, construction, and mining machinery; and engine, turbine, and power transmission equipment); electrical equipment, appliance, and component manufacturing (lighting, household appliances, and electrical equipment); and fabricated metal products.

The following tabulation shows wage and salary employment in manufacturing industries employing the most assemblers and fabricators in 2002.

Transportation equipment manufacturing	397,000
Computer and electronic product manufacturing	285,000
Machinery manufacturing	209,000
Electrical equipment, appliance, and component manufacturing	160,000
Fabricated metal product manufacturing	155,000

Training, Other Qualifications, and Advancement

New assemblers and fabricators are normally entry-level employees. The ability to do accurate work at a rapid pace and to follow detailed instructions are key job requirements. A high school diploma is preferred for most positions. Following detailed assembly instructions requires basic reading skills, although many instructions rely on pictures and diagrams.

Applicants need specialized training for some assembly jobs. For example, employers may require that applicants for electrical or electronic assembler jobs be technical school graduates or have equivalent military training. Other positions require only on-the-job training, sometimes including employer-sponsored classroom instruction, in the broad range of assembly duties that employees may be required to perform.

Good eyesight, with or without glasses, is required for assemblers and fabricators who work with small parts. Plants that make electrical and electronic products may test applicants for color vision, because many of their products contain many differently colored wires. Manual dexterity and the ability to carry out complex, repetitive tasks quickly and methodically also are important.

As assemblers and fabricators become more experienced, they may progress to jobs that require greater skill and be given more responsibility. Experienced assemblers may become product repairers if they have learned the many assembly operations and understand the construction of a product. These workers fix assembled articles that operators or inspectors have identified as defective. Assemblers also can advance to quality control jobs or be promoted to supervisor. Experienced assemblers and fabricators also may become members of research and development teams, working with engineers and other project designers to design, develop, and build prototypes, and test new product models. In some companies, assemblers can become trainees for one of the skilled trades, such as machinist. Those with a background in math, science, and computers may advance to become programmers or operators of more highly automated production equipment.

Job Outlook

Employment of assemblers and fabricators is expected to decline through the year 2012, reflecting increasing automation and the shift

of assembly to countries with lower labor costs. As manufacturers strive to improve precision and productivity, automated machinery increasingly will be used to perform work more economically and more efficiently. Technological advances should continue raising the productivity of assembly workers and adversely affecting their employment. Many job openings will result from the need to replace workers leaving this large occupational group.

The effects of automation will be felt more among some types of assemblers and fabricators than among others. Automated manufacturing systems are expensive, and a large volume of repetitive work is required to justify their purchase. Also, where the assembly parts involved are irregular in size or location, new technology only now is beginning to make inroads. For example, much assembly in the aerospace industry is done in hard-to-reach locations—inside airplane fuselages or gear boxes, for example—which are unsuited to robots; as a result, aircraft assemblers will not be easily replaced by automated processes, although employment of aircraft assemblers is still expected to decline due to the projected employment decline in the aerospace industry. On the other hand, automation increasingly will be used in the precision assembly of electronic goods, in which a significant number of electronics assemblers are employed.

Many producers send their assembly functions to countries where labor costs are lower. This trend in assembly, promoted by more liberal trade and investment policies, results in shifts in the composition of America's manufacturing workforce. Decisions by American corporations to move assembly to other nations should limit employment growth for assemblers in some industries, such as electronics assembly, but a free trade environment also may lead to growth in the export of goods assembled in the United States.

Earnings

Earnings vary by industry, geographic region, skill, educational level, and complexity of the machinery operated. In 2002, median hourly earnings were \$ 18.71 for aircraft structure, surfaces, rigging, and systems assemblers; \$14.02 for engine and other machine assemblers; \$11.07 for coil winders, tapers, and finishers; \$11.83 for fiberglass laminators and finishers; \$11.63 for timing device assemblers, calibrators, and adjusters; \$12.15 for electro-mechanical equipment assemblers; and \$11.00 for all other assemblers.

Median hourly earnings of team assemblers were \$10.90 in 2002. The middle 50 percent earned between \$8.81 and \$13.84. The lowest 10 percent earned less than \$7.41, and the highest 10 percent earned \$17.73. Median hourly earnings in the manufacturing industries employing the largest numbers of team assemblers in 2002 are shown below:

Motor vehicle parts manufacturing	\$12.36
Other wood product manufacturing	10.44
Plastics product manufacturing	10.24
Other miscellaneous manufacturing	9.58
Employment services	8.30

Median hourly earnings of electrical and electronic equipment assemblers were \$11.03 in 2002. The middle 50 percent earned between \$9.02 and \$13.84. The lowest 10 percent earned less than \$7.57, and the highest 10 percent earned more than \$17.38. Median hourly earnings in the manufacturing industries employing the largest numbers of electrical and electronic equipment assemblers in 2002 are shown below:

Navigation, measuring, electromedical, and control instruments manufacturing	\$12.21
Computer and peripheral equipment manufacturing	12.01
Electrical equipment manufacturing	11.95
Communications equipment manufacturing	10.87
Semiconductor and other electronic component manufacturing	10.77

Many assemblers and fabricators are members of labor unions. These unions include the International Association of Machinists and Aerospace Workers; the United Electrical, Radio and Machine Workers of America; the United Automobile, Aerospace and Agricultural Implement Workers of America; the International Brotherhood of Electrical Workers; and the United Steelworkers of America.

Related Occupations

Other occupations that involve operating machines and tools and assembling products include welding, soldering, and brazing workers; and machine setters, operators, and tenders—metal and plastic. Assemblers and fabricators also are responsible for some quality control and product testing, as is the case for inspectors, testers, sorters, samplers, and weighers.

Sources of Additional Information

Information about employment opportunities for assemblers is available from local offices of the State employment service and from locals of the unions mentioned earlier.